



***City of Santa Barbara***  
***Storm Water BMP Guidance Manual***  
***Training for City Staff***

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June 25, 2009  
David Gebhard Public Meeting Room  
630 Garden Street

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|-----------------|--|
| <b>10:00 am</b> | <b>Welcome and Introduction</b><br><i>Autumn Malanca – City of Santa Barbara Creeks Division</i>   |
| <b>10:10 am</b> | <b>Presentation</b><br><i>Brandon Steets, PE - Geosyntec Consultants</i>   |
| <b>11:15 am</b> | <b>Question and Answer Session</b><br><i>Brandon Steets, PE - Geosyntec Consultants</i><br><i>Autumn Malanca – City of Santa Barbara Creeks Division</i> |
| <b>12:00 pm</b> | <b>Closing Remarks/Workshop Evaluation</b><br><i>Autumn Malanca - City of Santa Barbara Creeks Division</i>  |

**Table 1-1: Post-Construction Project Tiers**

Tiers	Project Type	Requirement	Applicable Report Chapters				
			Chapter 2: Site Assessment and BMP Selection	Chapter 3: Site Soil and Infiltration Assessment	Chapter 4: Site Design BMP Options	Chapter 5: Basic BMP Options	Chapter 6: Storm Water Runoff BMP Options
<b>Tier 1 (Voluntary)</b>	SMALL PROJECTS <sup>1</sup> (Projects with < 500 sq. ft. of new or replaced impervious area)	Voluntary use of site design, basic, and/or storm water runoff BMP options	▼	▼	▼	▼	▼
<b>Tier 2 (Basic Requirements)</b>	MEDIUM PROJECTS <sup>1</sup> (Projects with 500 to 4000 sq.ft. of new or replaced impervious area)	Select and implement Basic BMP option(s) and identify on the Site Plan	▼	▼	▼	✓	▼
<b>Tier 3 (Storm Water Runoff Requirements)</b>	LARGE PROJECTS <sup>1</sup> (Commercial, Residential > 4000 sq. ft. of new or replaced impervious area, Mixed Use, Parking Lots 10 or more spaces, Hillside Residential, and Public Works Projects) <sup>2</sup>	Meet the <i>Storm Water Runoff Requirements</i> <sup>3</sup> through site design, basic BMPs, and storm water runoff BMP options	✓	✓	✓	✓	✓

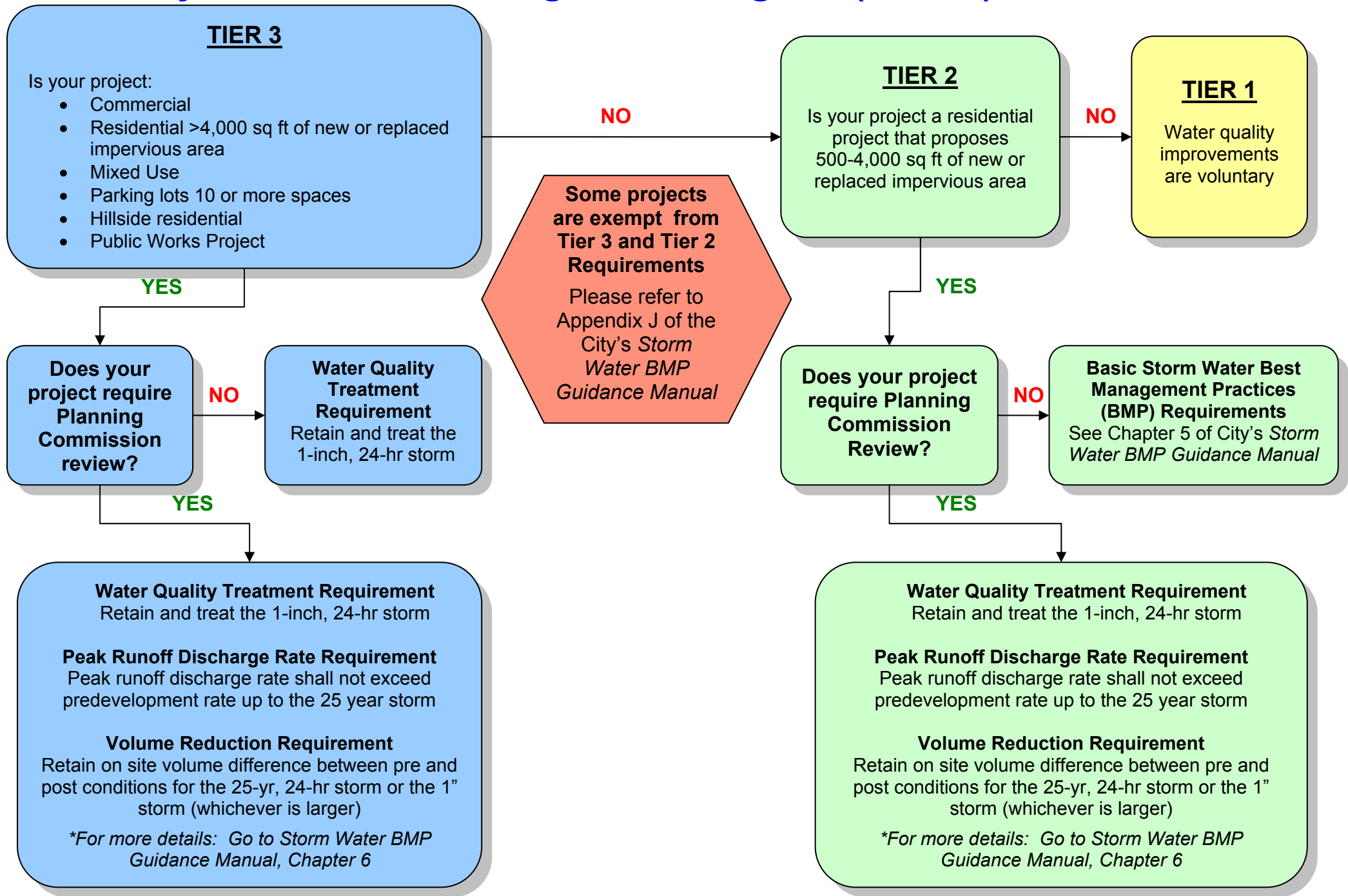
<sup>1</sup> Small, Medium, Large projects more specifically defined in Section 1.4

<sup>2</sup> Exemptions outlined in Appendix J.

<sup>3</sup> The *Storm Water Runoff Requirements* as defined in the City's SWMP (and Chapter 6 of this Manual).

Required	Voluntary
✓	▼

# City Storm Water Management Program (SWMP) Flow Chart



## APPENDIX J LIST OF DISCRETIONARY PROJECTS EXEMPT FROM TIER 3 REQUIREMENTS

**(These projects are exempt from the Tier 3 storm water runoff requirements, but some *may be* subject to Tier 2 Basic BMP requirements)**

- 2nd story additions (i.e. additions that do not increase the building footprint); treat as Tier 2 if the project is under 4,000 square feet
- Site work/repairs/replacements of impervious surfaces that total less than 500 square feet; treat as Tier 2 if a permit is required
- Interior remodel or alteration projects
- Cosmetic improvements/alterations (i.e. painting, door replacement, window replacement, façade remodel, replastering of a structure, awnings, etc.)
- Retaining walls, Fences, Gates, Trellises, Trash enclosures (i.e. vertical structures with impervious surface areas less than 500 square feet)
- Sign installation or repairs
- Electrical/plumbing/mechanical projects with impervious surfaces that total less than 500 square feet
- Raised decks, stairs, or walkways (not built directly on the ground) designed with spaces to allow for water drainage
- Parking lots, walkways, etc. designed to be permeable (permeable concrete or asphalt, permeable pavers, grass pavers, etc.)
- Landscaping projects; treat as Tier 2 if permit is required
- Excavations/demolitions/grading that does not result in 500 square feet or more of developed or redeveloped impervious surface area
- Installing photovoltaic systems
- Reroofing projects involving no increase in roof surfaces; treat as Tier 2 if roof work is over 500 square feet
- Repair permits to structures
- One story accessory building or garage less than 500 square feet
- Addition of chimneys or BBQ areas (assuming hardscape is less than 500 square feet)
- New skylights
- Exterior lighting projects
- Spas/pools less than 500 square feet
- Temporary structures (temporary = 6 months; non-recurring)
- Electrical and utility vaults, sewer and water lift stations, backflows and other utility devices, with a roof area of less than 500 square feet in size
- Remediation equipment mandated by the County or another governmental agency as part of a site cleanup
- Repair or replacement of airfield paving within Airfield Operations Area (AOA) where there is no expansion of the paved area
- Above-ground fuel storage tanks and fuel farms with spill containment systems
- Septic system installation or repairs
- Technical or legal infeasibility (where strict compliance with the City's storm water runoff requirements is found to be infeasible, the project applicant must utilize all feasible measures to achieve the greatest compliance possible)



# Storm Water Management Program (SWMP) Requirements Summary

## INTRODUCTION

The City's adopted Storm Water Management Program (SWMP) identifies project requirements and the City's Storm Water Best Management Practices (BMP) Guidance Manual categorizes development projects into three tiers. This handout explains the general requirements for each tier.

### **TIER 1 – SMALL PROJECTS** (*Water quality improvements are voluntary*)

If a project is not in Tier 2 or Tier 3 and proposes **500 square feet or less** of new or replaced impervious area; then no storm water management requirements are triggered. Water quality improvements are voluntary. Water quality BMPs are encouraged.

### **TIER 2 – MEDIUM PROJECTS, RESIDENTIAL ONLY** (*"Basic" Storm Water BMP Requirements*)

If a residential project is not in Tier 3 and proposes **500 – 4,000 square feet** of new or replaced impervious area (footprint); then "basic" storm water BMP requirements are triggered. Basic BMP options are defined in Chapter 5 of the *City's Storm Water BMP Guidance Manual*. Tier 2 projects are required to select one or more basic BMP option(s) from Chapter 5 appropriate for the proposed project site, and demonstrate on a site plan where the BMP(s) will be implemented. There are no specific storm water treatment, rate, or volume requirements for Tier 2 projects. See the City's *Homeowner's Guide to Managing Storm Water*.

### **TIER 3 - LARGE PROJECTS** (*SWMP Requirements apply*)

If a project is subject to discretionary review (i.e. it needs additional approval beyond a Building Permit) and is in one of the following categories, then the City's SWMP requirements are triggered, unless the project is exempt. See page 2 of this handout for a list of projects which are exempt from Tier 3 requirements.

- Hillside residential
- Residential greater than 4,000 sq. ft. of new or replaced impervious area
- Mixed Use
- Parking lots 10 or more spaces
- Commercial
- Public Works Project

**Tier 3 Water Quality Treatment Requirement:** Retain and treat, at a minimum, the calculated amount of post-construction runoff from the project site for a one-inch, 24-hour storm event. Refer to Chapter 6 of the *City's Storm Water BMP Guidance Manual*, posted at: [www.sbcreeks.org](http://www.sbcreeks.org) and/or <http://www.santabarbaraca.gov/Resident/Home/Guidelines/>

#### Planning Commission Review

The following additional SWMP requirements apply to Planning Commission projects.

**Peak Runoff Discharge Rate Requirement:** Provide detention so that post-development peak storm water runoff discharge rate does not exceed pre-development rate, up to a 25-year, 24-hour storm event.

**Volume Reduction Requirement:** Retain on-site the larger of the following two volumes: (1) the volume difference between the pre- and post-conditions for the 25-year, 24-hour design storm, or (2) the volume generated from a one-inch, 24-hour storm event.

## **PROJECTS EXEMPT FROM TIER 3 SWMP REQUIREMENTS**

These projects are exempt from the Tier 3 storm water runoff requirements, but some projects may be subject to Tier 2 Basic BMP requirements.

### **Residential Small Additions**

- One story accessory building or garage less than 500 square feet
- Second story addition only (i.e. additions that do not increase the building footprint); treat as Tier 2 if the project is under 4,000 square feet

### **Residential/Commercial/Institutional/Etc.**

#### Site work/ alterations / remodel

- Site work/repairs/replacements of impervious surfaces that total less than 500 square feet; treat as Tier 2 if a permit is required
- Addition of chimneys or BBQ areas (assuming hardscape is less than 500 square feet)
- Interior remodel or alteration projects
- Cosmetic improvements/alterations (i.e. painting, door replacement, window replacement, façade remodel, replastering of a structure, awnings, etc.)
- Retaining walls, fences, gates, trellises, trash enclosures (i.e. vertical structures with impervious surface areas less than 500 square feet)
- Raised decks, stairs, or walkways (not built directly on the ground) designed with spaces to allow for water drainage
- Parking lots, walkways, etc. designed to be permeable (permeable concrete or asphalt, permeable pavers, grass pavers, etc.)
- Landscaping projects; treat as Tier 2 if permit is required
- Repair permits to structures
- Exterior lighting projects
- Spas/pools less than 500 square feet
- Excavations/demolitions/grading that does not result in 500 square feet or more of developed or redeveloped impervious surface area

#### Rooftop Projects

- Reroofing projects involving no increase in roof surfaces; treat as Tier 2 if roof work is over 500 square feet
- New skylights

#### Miscellaneous

- Temporary structures (temporary = 6 months; non-recurring)
- Electrical and utility vaults, sewer and water lift stations, backflows and other utility devices, with a roof area of less than 500 square feet in size
- Sign installation or repairs
- Septic system installation or repairs
- Electrical/plumbing/mechanical projects with impervious surfaces that total less than 500 square feet
- Installing photovoltaic systems
- Remediation equipment mandated by a governmental agency as part of a site cleanup
- Above-ground fuel storage tanks and fuel farms with spill containment systems
- Repair or replacement of airfield paving within Airfield Operations Area (AOA) where there is no expansion of the paved area

D R A F T  
City of Santa Barbara Development Application Review Team (DART)  
Storm Water Management Plan (SWMP)

**DART SWMP CHECKLIST**

Project Address: \_\_\_\_\_ Project Type: \_\_\_\_\_  
MST \_\_\_\_\_ PRT or DART: \_\_\_\_\_  
Date: \_\_\_\_\_ Case Planner: \_\_\_\_\_  
Project Area Acreage: \_\_\_\_\_ Acres Disturbed: \_\_\_\_\_ Slope %: \_\_\_\_\_ Adjacent to Creek Y/N: \_\_\_\_\_

The following design standards and best management practices (BMP) for storm water management are required under National Pollution Discharge Elimination System (NPDES) provisions ( State Regional Water Quality Control Board Phase II General Permit for the City). These measures are included in the City Storm Water Management Plan (SWMP) adopted to implement the NPDES requirements through the City development and redevelopment review and permitting process. The City is required to document to the Regional Board yearly how these measures have been implemented.

As part of a pre-application or application review process for a project discretionary permit by the City, DART members review for project design standards and other BMPs that can feasibly be taken to reduce storm water pollution to the maximum extent practicable.

Identify whether measures on the checklist are applicable, and whether they are applied through a project design revision prior to permit approval, and/or a condition of project approval. If the measure is not feasible, indicate why not.

**1.0 CONSTRUCTION PHASE BEST MANAGEMENT PRACTICES**

**1.1 Erosion and Sedimentation Control (*Building and Safety*)**

- ☐ Not applicable. Project does not involve ground disturbance.
- ☐ Apply Standard Erosion Control Measures as condition (where disturbed soil <1 acre, slope <15%, property not adjacent to creek).
- ☐ Detailed Erosion Control Plan required (where disturbed soil  $\geq$  1 acre, slope > 15%, property adjacent to creek):
  - \_\_\_ Detailed Plan required as part of DART application. Apply condition requiring plan implementation; or
  - \_\_\_ Apply condition requiring Detailed Plan submittal and approval prior to Building Permit, and plan implementation.

**2.0 POST-CONSTRUCTION BEST MANAGEMENT PRACTICES**

**2.1 Peak Storm Water Run-Off Discharge Rates (*Public Works*)**

- ☐ Not applicable. Project involves no/minimal change in permeable surface or peak storm water run-off discharge rate. No BMPs required.
- ☐ Drainage calculations are required as part of DART application (using County of Santa Barbara hydrograph data and Manning equation). \_\_\_ Drainage calculations are adequate.
- ☐ Project design would not increase peak 25-year storm water run-off and would reduce peak storm water run-off discharge rate to the maximum extent practicable, through:
  - \_\_\_ Any increase in run-off will be retained on-site and filtered using structural BMPs such as detention basins, bioswales (vegetated filters), and/or mechanical BMPs such as manufactured filters.  
BMPs \_\_\_\_\_
  - \_\_\_ Increase in water will be retained with underground tanks.
- ☐ BMPs will be applied as follows:
  - \_\_\_ Project design as proposed (with condition of approval requiring project implementation as proposed, and ongoing maintenance of BMPs if applicable).
  - \_\_\_ Revised project design submitted as part of the DART process (and application of condition of approval requiring project implementation as revised, and ongoing maintenance of BMPs).

- \_\_\_ Application of a condition of approval requiring feasible project design changes and/or other BMPs, and ongoing maintenance of BMPs.

## 2.2 Structural and Treatment Control BMPs (*Public Works, Creeks*)

- ☐ Not applicable.
- 
- ☐ Long-term volumetric treatment control BMP will be incorporated into the project development (design criterion is a 1" storm).
- 
- ☐ Long-term flow-based treatment control BMP will be applied (design criterion is .25" for four hours).
- 
- ☐ BMPs will be applied as follows:
- \_\_\_ Project design as proposed (with condition of approval requiring project implementation as proposed and ongoing maintenance of BMPs if applicable).
- \_\_\_ Revised project design submitted as part of the DART process (and application of condition of approval requiring project implementation as revised, and ongoing maintenance of BMPs).
- \_\_\_ Application of a condition of approval requiring feasible project design changes and/or other BMPs, and ongoing maintenance of BMPs.

## 2.3 Minimization of Storm Water Pollutants of Concern (*Creeks, Public Works*)

- ☐ Not applicable
- ☐ General pollutants/ small projects: Passive, low maintenance BMPs will be applied through minimizing hardscape; vegetative swales, use of permeable paving; and/or detention basin.
- 
- ☐ Automotive pollutants/ oil, grease, metals: The following BMPs will be applied for projects with 10 or more parking spaces: \_\_\_ Runoff from entrance drive for covered parking will be treated by collecting water in a trench drain and filtering before discharge. \_\_\_ Basement parking garages will provide treatment of any storm water discharged from basement garage to storm drain. \_\_\_ Runoff will be discharged to a vegetated swale or constructed sand filter, or through a manufactured BMP (drain filter or wet-sump filter).
- 
- ☐ Erosion and Sedimentation/ suspended solids: Projects in hillsides, near creeks, or involving substantial earthwork: BMPs applied for long-term post-construction slope stability and erosion/sedimentation control, such as site layout to avoid  $\geq 15\%$  slopes, adequate setbacks from creeks.
- 
- ☐ BMPs will be applied as follows:
- \_\_\_ Project design as proposed (with condition of approval requiring project implementation as proposed and ongoing maintenance of BMPs if applicable).
- \_\_\_ Revised project design submitted as part of the DART application process (and condition of approval requiring project implementation as revised, and ongoing maintenance of BMPs).
- \_\_\_ Condition of approval requiring feasible project design changes and/or other BMPs, and ongoing maintenance of BMPs.

## 2.4 Natural Area Conservation BMPs (*Planning*)

- ☐ Not applicable.
- 
- ☐ Development is clustered leaving remaining land in natural condition.
- 
- ☐ Grading and clearing of native vegetation is limited to amount needed for lots, access, and fire protection.
- 
- ☐ Trees and vegetation are maximized to the extent feasible, and use of drought-tolerant plants is promoted.
- 
- ☐ Natural vegetation is promoted through use of parking lot islands and other landscaped areas.
-

- ☐ Riparian areas and wetlands are preserved.
- 

- ☐ Natural area design standards will be incorporated to the extent applicable and feasible, consistent with City policies, as follows:

- ☐ Project design as proposed (with condition of approval requiring project implementation as proposed, and ongoing maintenance of BMPs if applicable).
- ☐ Revised project design submitted as part of the DART process (and application of condition of approval requiring project implementation as revised, and ongoing maintenance of BMPs).
- ☐ Application of a condition of approval requiring feasible project design changes and/or other BMPs, and ongoing maintenance of BMPs.

## **2.5 Protection of Slopes and Channels (*Planning, Building, Public Works, Creeks*)**

- ☐ Not applicable. Project is not adjacent to creek, and does not include substantial slopes.
- ☐ The following additional information has been required:

☐ Existing site conditions: geomorphic, hydraulic, biological, geotechnical; top-of-bank determination.

☐ Proposed project information and plans, potential effects on slopes and channels, and plans/measures to protect slopes/channels (preliminary grading plan; preliminary drainage plan; slope stability, permanent erosion control, vegetation management, preliminary creek restoration and enhancement plan, including protection of biological values such as shade provisions, water temperature maintenance, nutrient filtering, wildlife movement corridors; fish movement; wildlife habitat protection.)

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- ☐ Runoff will be conveyed safely from the toes of slopes and disturbed slopes will be stabilized.
- 

- ☐ Natural drainage channels will be used to the maximum extent practicable.
- 

- ☐ Permanent channel crossings will be stabilized.
- 

- ☐ Slopes will be vegetated with appropriate native or drought-tolerant vegetation.
- 

- ☐ Energy dissipaters, such as riprap, will be installed at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion with the approval of all agencies with jurisdiction.
- 

- ☐ The project will incorporate slope and/or channel protection design standards to the extent applicable and feasible, consistent with applicable City policies, as follows:

☐ Project design as proposed (with condition of approval requiring project implementation as proposed, and ongoing maintenance of BMPs if applicable); or

☐ Revised project design submitted as part of the DART process (and application of condition of approval requiring project implementation as revised, and ongoing maintenance of BMPs); or

☐ Condition of approval requiring feasible project design changes and/or other BMPs, and ongoing maintenance of BMPs.

## **2.6 Storm Drain Stenciling and Signage (*Public Works, Building*)**

- ☐ Not applicable. No storm drain inlets.
- ☐ Condition of approval will be applied that public and private storm drain inlets and catch basins within the project area must be stenciled with language and/or graphic icons prohibiting dumping of improper materials directly into the storm water conveyance system. Signs prohibiting illegal dumping must be posted at public access points along channels and creeks within the project area. Legibility of stenciling and signs must be maintained.

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## 2.7 Outdoor Material Storage Design (*Planning, Building*)

- ☐ Not applicable. No outdoor material storage area.
  - ☐ Materials with the potential to pollute storm water will be placed within an enclosure such as cabinet, shed or similar structure that prevents contact with runoff or spillage to the storm water conveyance system, or will be protected by secondary containment structures such as berms, dikes, or curbs. The storage area will be paved and sufficiently impervious to contain leaks and spills. The storage will have a roof or awning to minimize collection of storm water within the secondary containment.
- 
- ☐ The project will incorporate BMPs as follows:
    - ☐ Project design as proposed incorporates these measures.
    - ☐ Revised project design submitted as part of DART review process incorporates these measures.
    - ☐ These measures are feasible and will be applied as a condition of permit approval.

## 2.8 Trash Storage Area Design (*Public Works*)

- ☐ Not applicable. No trash storage area.
  - ☐ Trash containers will have drainage from adjoining roofs and pavement diverted around the areas; and trash container areas will be screened or walled to prevent off-site transport of trash. Individual single family residences may be exempted if determined by City to be infeasible.)
  - ☐ The BMPs will be incorporated as follows:
    - ☐ Project design as proposed.
    - ☐ Revised project design submitted as part of DART review process.
    - ☐ These measures are feasible and will be applied as a condition of permit approval.
- 

## 2.9 Ongoing BMP Maintenance (*Planning, Building, Public Works, Creeks*)

- ☐ Not applicable. No BMPs are required.
  - ☐ Condition will be applied to establish BMP maintenance agreement providing owner ongoing maintenance and yearly inspection.
- 

## 2.10 Design Standards for Specified Individual Project Categories (*Planning, Building, Public Works, Creeks*); refer to the Design Standards of Attachment 4 of the State General Permit (WQO 2003-0005-DWQ); per City SWMP, all discretionary projects, regardless of size, shall comply with the Design Standards in Attachment 4.

- ☐ Not applicable.
  - ☐ Commercial Projects: Proper design of loading/unloading dock areas; repair/maintenance bays; vehicle wash areas to protect water quality.
- 
- ☐ Restaurants: Proper design of equipment/ accessory wash areas to protect water quality.
- 
- ☐ Retail Gasoline Outlets: Proper design of fueling areas to protect water quality.
- 
- ☐ Automotive Repair Shops: Proper design of fueling areas; repair/maintenance bays; vehicle/equipment wash areas; and loading/unloading dock areas to protect water quality.
- 
- ☐ Parking Lots: Proper design of parking areas to protect water quality; and operational provisions to limit oil contamination.
-

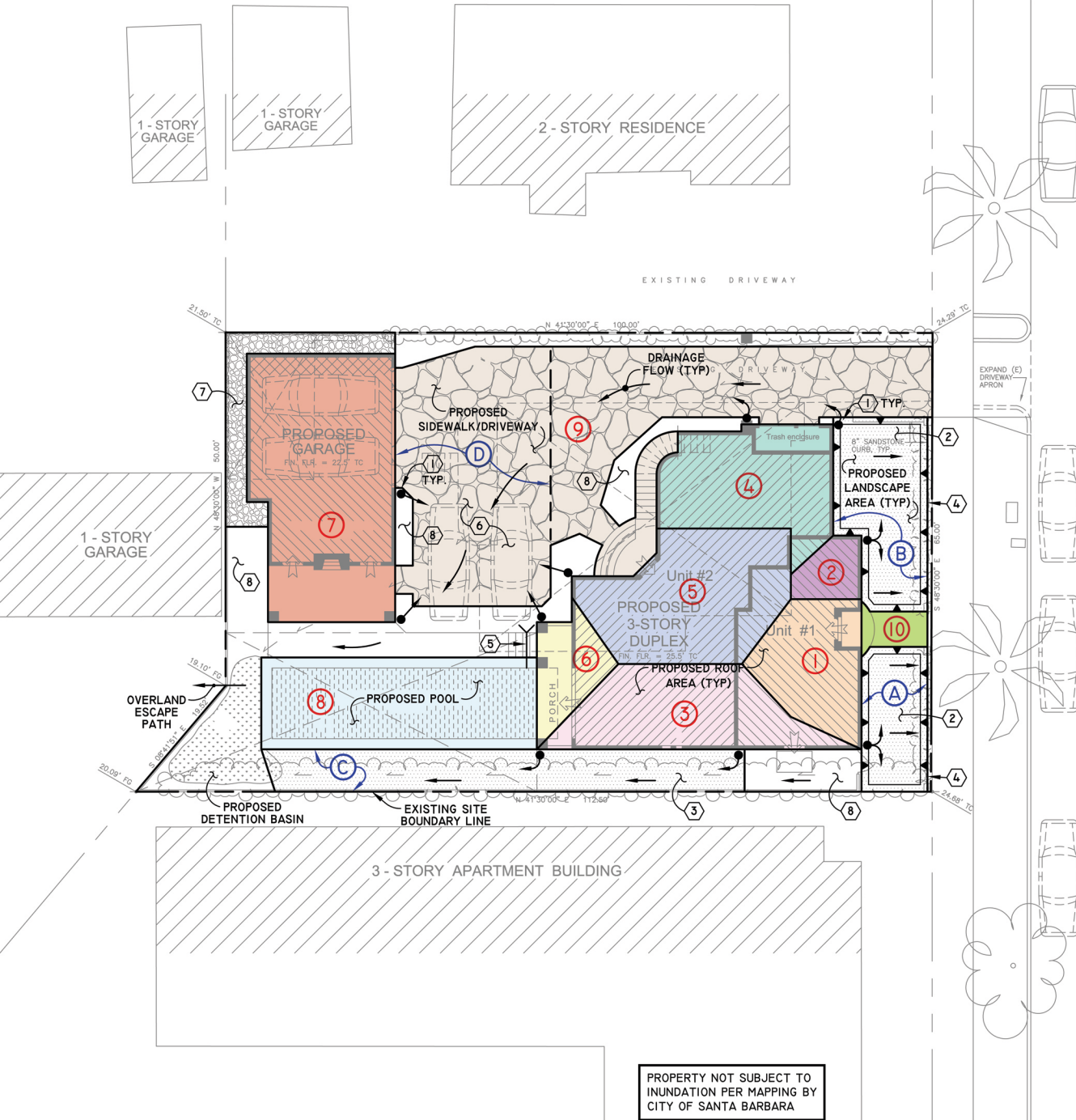
- ☐ BMPs will be incorporated as follows:
  - ☐ Project design as proposed.
  - ☐ Revised project design submitted as part of DART review process.
  - ☐ These measures are feasible and will be applied as a condition of permit approval.

**PRELIMINARY PERMANENT POLLUTION PREVENTION MEASURES**  
**ANALYSIS**

Project Address  
Santa Barbara, CA 93101

January 2009

**Michael Viettone Civil Engineering**  
610 Anacapa Street, Suite C-7  
Santa Barbara, CA 93101  
Ph (805) 966-5446 Fax (805) 966-3517

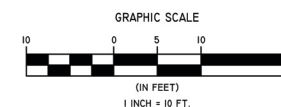


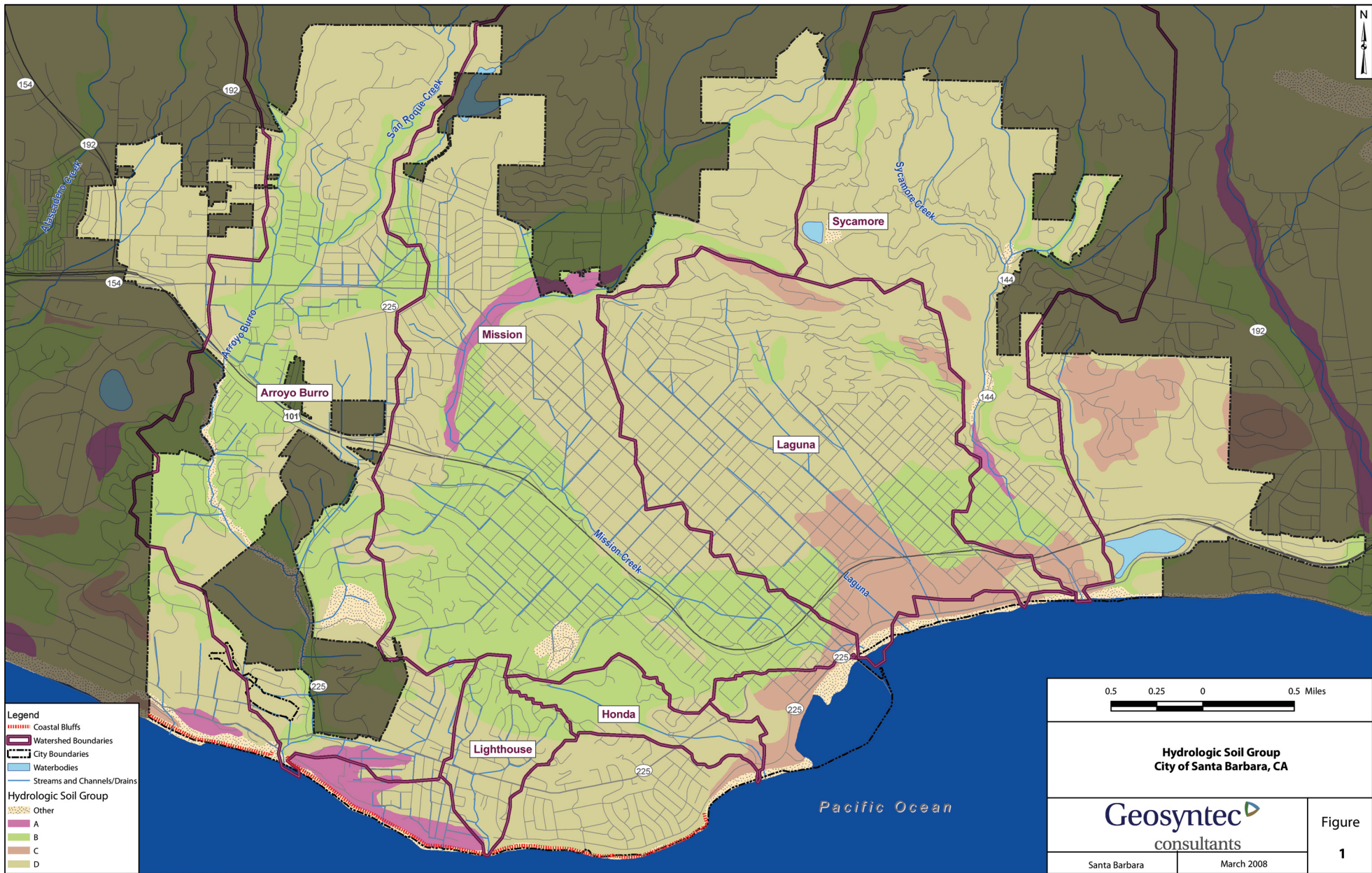
#### CONSTRUCTION NOTES LEGEND:

- 1 ROOF DRAIN TO DAYLIGHT AT PROPOSED FINISH GRADE ON SPLASH BLOCK.
- 2 VEGETATED FILTER STRIP TO TREAT ROOF DRAINAGE.
- 3 VEGETATED SWALE FILTER TO TREAT ROOF DRAINAGE.
- 4 PROVIDE GAP IN SANDSTONE CURB TO ACCOMMODATE DRAINAGE FROM VEGETATED FILTER STRIP.
- 5 PROVIDE OVERFLOW DRAIN FROM POOL TO DRIVEWAY. OVERFLOW DRAIN TO ALLOW RAIN WATER COLLECTED ON TOP OF POOL COVER TO BE CONVEYED TO DRIVEWAY.
- 6 PERMEABLE PAVEMENT. DISCHARGE OF 2' THICK± PERMEABLE PAVEMENT SECTION TO BE DIRECTED TO PROPOSED DETENTION BASIN.
- 7 3" THICK GRAVEL MAINTENANCE PATH.
- 8 LANDSCAPE AREAS.

#### AREA SUMMARY TABLE

AREA NUMBER	SQUARE FEET
1	250
2	70
3	350
4	360
5	460
6	140
7	740
8	510
9	1580
10	50
A	200
B	330
C	420
D	700





## 2 SITE ASSESSMENT AND BMP SELECTION

### 2.1 Assessing Site Conditions and Other Constraints

An integral step in designing a site that incorporates an appropriate combination of post-construction storm water BMPs (including site design, basic BMPs, and storm water runoff BMPs as discussed in Chapters 4 through 6) as required by project tiers, is assessing the existing site conditions. Whether a site is being developed for the first time or is being redeveloped, there are multiple opportunities in the development process to incorporate post-construction storm water BMPs to enhance the hydrologic and ecological functionality of a site and meet project tier requirements (See Section 1.3).

**The maps in Appendix B should be used to identify possible site constraints early in the process** before (not in lieu of) the required soil assessment (Chapter 3), to get a general idea of local conditions. The maps in Appendix B provide general information on the distributions of hydrologic soil types and percent slope ranges, as well as the approximate locations of the Hillside Design and Coastal Bluff Districts. The information in these tables and figures provides general guidance on site characteristic trends within the City; however, verification of characteristics that are integral to a BMP must be conducted independently to account for site specific characteristics.

In order to select appropriate BMPs and possible locations for them, the designer must accurately assess the specific existing site conditions. A comprehensive site assessment that identifies critical site characteristics is integral to the successful design and implementation of all types of post-construction storm water BMPs. While the information gathered during the site assessment may not need to be submitted to the City (depending on tier and type of information gathered), it will assist in determining which types of BMPs may be implemented, combined, and located throughout the site. For Tier 3 projects, one or more qualified professionals (e.g., civil engineer, landscape architect, certified storm water professional, and/or geotechnical engineer) should conduct the site assessment evaluating existing conditions, including the site's hydrology, topography, soils, and vegetation. Types of information that are required for the site designer, though not all are required to be provided to the City, and are typically included in the site assessment are shown in Table 2-1 below.

**Table 2-1: Typical Site Assessment Information**

Assessment Category	Type of Information
Existing Hydrology/Hydrography	<ul style="list-style-type: none"> <li>• Site drainage patterns</li> <li>• Flood hazards</li> <li>• Depth to groundwater</li> <li>• Connections to the storm drain system</li> <li>• Nearby waterways (including receiving water quality and hydraulic conditions)</li> <li>• Locations of any seeps or springs</li> </ul>

Assessment Category	Type of Information
Existing Topography	<ul style="list-style-type: none"> <li>• Surface drainage paths</li> <li>• Locations of local high and low points</li> <li>• Significant geologic features</li> <li>• Steep slopes and/or cliffs</li> </ul>
Existing Soils	<ul style="list-style-type: none"> <li>• Identification of soil types (hydrologic soil group)</li> <li>• Permeability</li> <li>• Site susceptibility to erosion, landslides, and other geotechnical hazards</li> <li>• Depths of subsoil</li> </ul>
Existing Vegetation	<ul style="list-style-type: none"> <li>• Types and relative amounts</li> <li>• Estimate of site evapotranspiration rate</li> <li>• Identify weed species</li> <li>• Identify sensitive species</li> </ul>
Climate conditions	<ul style="list-style-type: none"> <li>• Average precipitation</li> <li>• Seasonal variation in precipitation</li> <li>• Temperature range</li> </ul>
Local Regulatory	<ul style="list-style-type: none"> <li>• Municipal zoning ordinances</li> <li>• Design standards</li> <li>• Design guidelines</li> </ul>
Local Services/Utilities	<ul style="list-style-type: none"> <li>• Proximity of utilities to site (including locations if on-site)</li> <li>• Requirements of local services (e.g., fire safety)</li> </ul>

In addition to assessing existing site conditions, it is imperative (to the designer) to determine other constraints that will dictate design and implementation of post-construction storm water BMPs. Other important factors that may constrain design and implementation are the initial capital costs, the reliability of selected BMPs, the need to meet specific reduction goals for specific pollutants of concern (see Section 2.2 and Tables 2-2 and 2-3), the need to meet the storm water runoff requirements for Tier 3 projects (Section 6.2), and on-going long-term maintenance that may be required. BMPs shall be selected based on the probability of long-term success including site specific factors that may contribute to or reduce the chance of failure of a given BMP to function properly (hydraulically and performance wise).

## 2.2 Assessing Pollutants of Concern

An important step in minimizing runoff pollution is identifying the pollutants of concern. The City of Santa Barbara has been conducting water quality monitoring programs since 1998. From these studies, the City has identified local pollutants of concern, both known and suspected, that must be considered when selecting BMPs. The City of Santa Barbara's SWMP lists seven pollutant groups as either known or suspected pollutants of concern. These pollutants can typically be related to land use, which means that the developed condition of the site provides some indication of the pollutants that will be generated, post-construction. Table 2-2 identifies pollutants of concern based on post-construction project land use. Table 2-2 provides general guidance; however, based on specific site characteristics or type of activity, pollutants of concern may be different from shown. Additional pollutants of concern may be

identified based on specific site characteristics, such as known soil contaminants in redevelopment sites or specific proposed site activities. BMPs shall be selected to address, at minimum, the pollutants of concern listed in Table 2-2 for the proposed land use(s) as well as those listed in Table 2-3 for 303(d) listed water bodies (i.e., surface waters listed by the State as “impaired” for certain pollutants of concern) that receive runoff from the project site.

**Table 2-2: Pollutants of Concern Based on Land Use**

Land Use	Pollutant Category of Concern						
	Trash	Nutrients	Bacteria	Metals	Sediment	Other	
						Hydrocarbons	Pesticides and Herbicides
Commercial, Institutional, and Mixed-Use Developments	✓	✓	✓		✓	✓	✓
Industrial	✓	✓	✓		✓	✓	✓
Roads and Parking Lots	✓	✓		✓	✓	✓	✓
Restaurants	✓	✓	✓			✓	
Automotive	✓			✓		✓	
Multi- and Single-Family Residences (Including Subdivisions)	✓	✓	✓		✓	✓	✓
Hillside Developments	✓	✓			✓	✓	✓

All of the pollutants of concern categories are described below, including common sources and common problems they cause.

### ***Trash***

The trash category includes debris and floatables. Trash enters storm water through streets and storm drain inlets, areas with high pedestrian traffic, and poor landscape maintenance practices. Not only are gross pollutants unsightly, but they may also interfere with oxygen exchange, carry bacteria, and cause vector problems.

### ***Nutrients (Nitrogen and Phosphorus)***

Potential sources of nutrients in storm water include fertilizer use (public and private), discharge of wash water that contains soaps and detergents (variety of sources including restaurants, commercial properties, and residential car washing). High nutrient concentrations may cause accelerated or excessive growth of algae and eutrophication in lakes and other water sources. In addition, a form of nitrogen may be toxic to fish.

***Bacteria***

Indicator bacteria (e.g., total/fecal coliform, *E. coli*, and enterococcus) are used to infer the presence of pathogenic organisms that are fecal in origin. Indicators are necessary due to difficulties in measuring pathogen concentrations directly. Potential sources of indicator bacteria include human excrement (from either direct deposit or leaking sewage or septic systems), animal excrement (both domestic and wild), and outdoor restaurant washing. High concentrations of indicator bacteria (i.e., those that exceed recreational contact standards) trigger the closure of beaches, lakes, and rivers.

***Metals***

In general, metals that can be found in storm water include cadmium, chromium, copper, lead, nickel, and zinc. Metals that have been identified as pollutants of concern by the City in storm water include magnesium, zinc, potassium, and iron. Potential sources include naturally occurring metals, automobiles, illegal or improper disposal of lead batteries, and many common materials (e.g., galvanized metal, paint, preserved wood, etc.). Metals can be toxic to aquatic organisms and contaminate drinking water supplies. Bioaccumulation is also a problem for some metals because as they accumulate in the tissues of organisms lower in the food chain they may potentially result in elevated levels in larger organisms that feed on them, which are food sources for humans.

***Sediment***

The City has identified natural erosion, dirt roads, creek side development, construction, land development, and agriculture as potential sources of sediment. While construction runoff is managed under a different program, land development and agriculture are the main sources that should target sediment when selecting BMPs. High sediment concentrations not only make the water appear murky, but also tend to carry adsorbed pollutants with them. In addition, downstream sedimentation may threaten fish and other aquatic life by interfering with respiration, growth, reproduction, photosynthesis, and oxygen exchange.

***Hydrocarbons***

Oil and grease enter storm water through a variety of mechanisms and sources, including automotive sources, leakages/spills, parking lots, restaurants, and illegal or improper disposal. Some of the hydrocarbons that are found in oil and grease are toxic to aquatic organisms and produce unsightly sheens, even at low concentrations. Some also present bioaccumulation risks.

***Pesticides***

Landscaped areas are potential sources of pesticides entering storm water. Pesticides include insecticides, herbicides, fungicides, and rodenticides. Some pesticides are toxic to aquatic organisms, even at low concentrations, and can bioaccumulate. Several chemical formulations are banned but even some allowed pesticides still present toxicity risk to aquatic organisms.

**Table 2-3: 303(d) Listed (2006) Water Bodies and Associated Pollutants**

303(d) Listed Water Body	Pollutant Category of Concern				
	Bacteria	Metals	Sedimentation and Siltation	Priority Organics	Unknown <sup>1</sup> Toxicity
Arroyo Burro Creek	✓				
Goleta Slough	✓	✓	✓	✓	
Mission Creek	✓				✓
Pacific Ocean at Arroyo Burro Beach	✓				
Pacific Ocean at East Beach (mouth of Mission Creek)	✓				
Pacific Ocean at East Beach (mouth of Sycamore Creek)	✓				
Pacific Ocean at Hope Ranch	✓				
Pacific Ocean at Leadbetter Beach	✓				

<sup>1</sup> Toxicity should be equated to metals and priority organics from Table 2-2.

The pollutants in the City's water bodies that are listed on the 2006 303(d) list as shown in Table 2-3, above, have been attributed to urban runoff, non-point sources, industrial point sources, and construction and land development.

## 2.3 BMP Selection Process

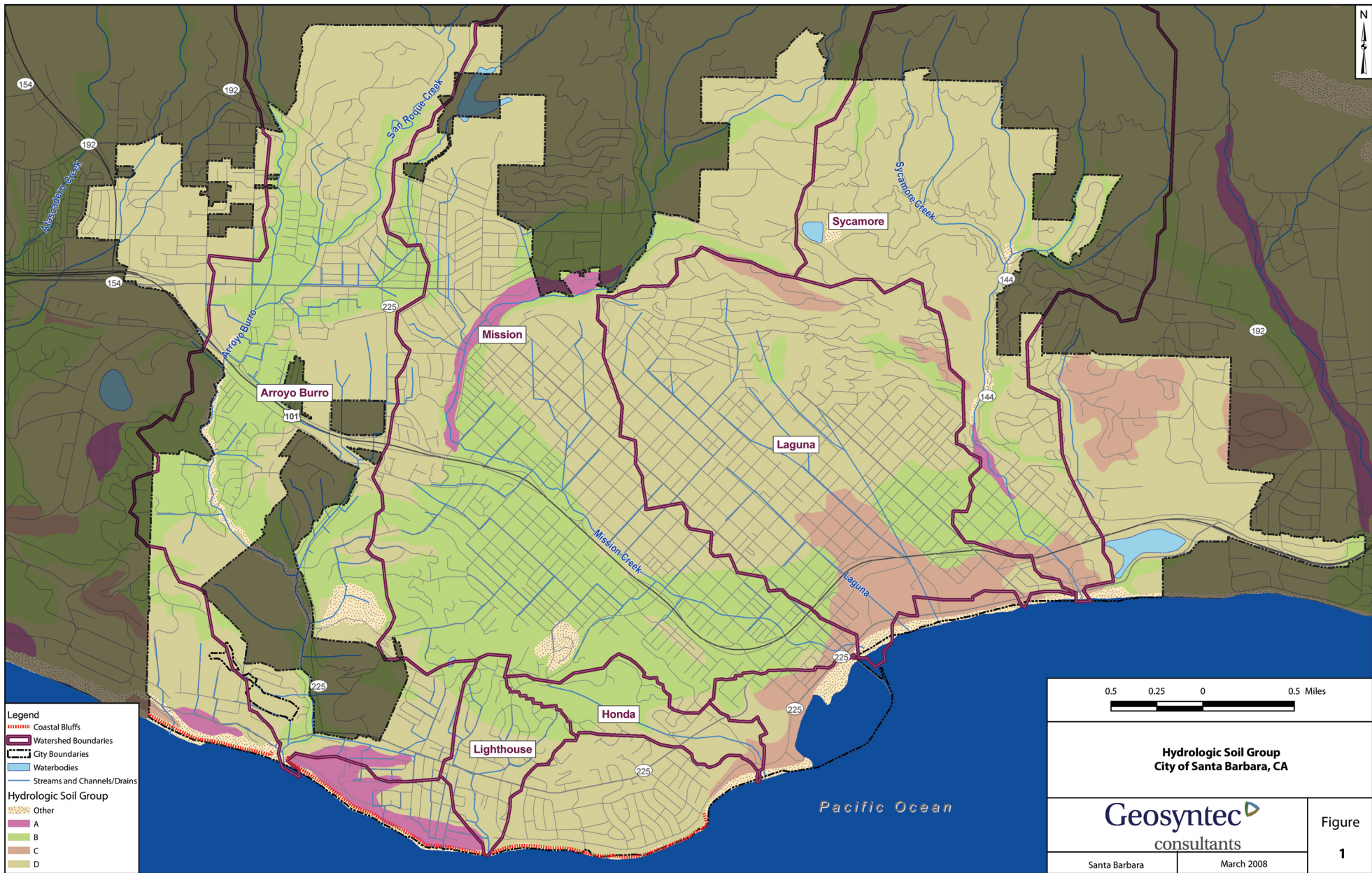
Important factors that may constrain BMP selection are the initial capital costs, the reliability of selected BMPs, the need to meet specific reduction goals for specific pollutants of concern (see Section 2.2), the need to meet the storm water runoff requirements for Tier 3 projects (Section 6.2), and on-going long-term maintenance that may be required. BMPs shall be selected based on the probability of long-term success including site specific factors that may contribute to or reduce the chance of failure of a given BMP to function properly (hydraulically and performance wise).

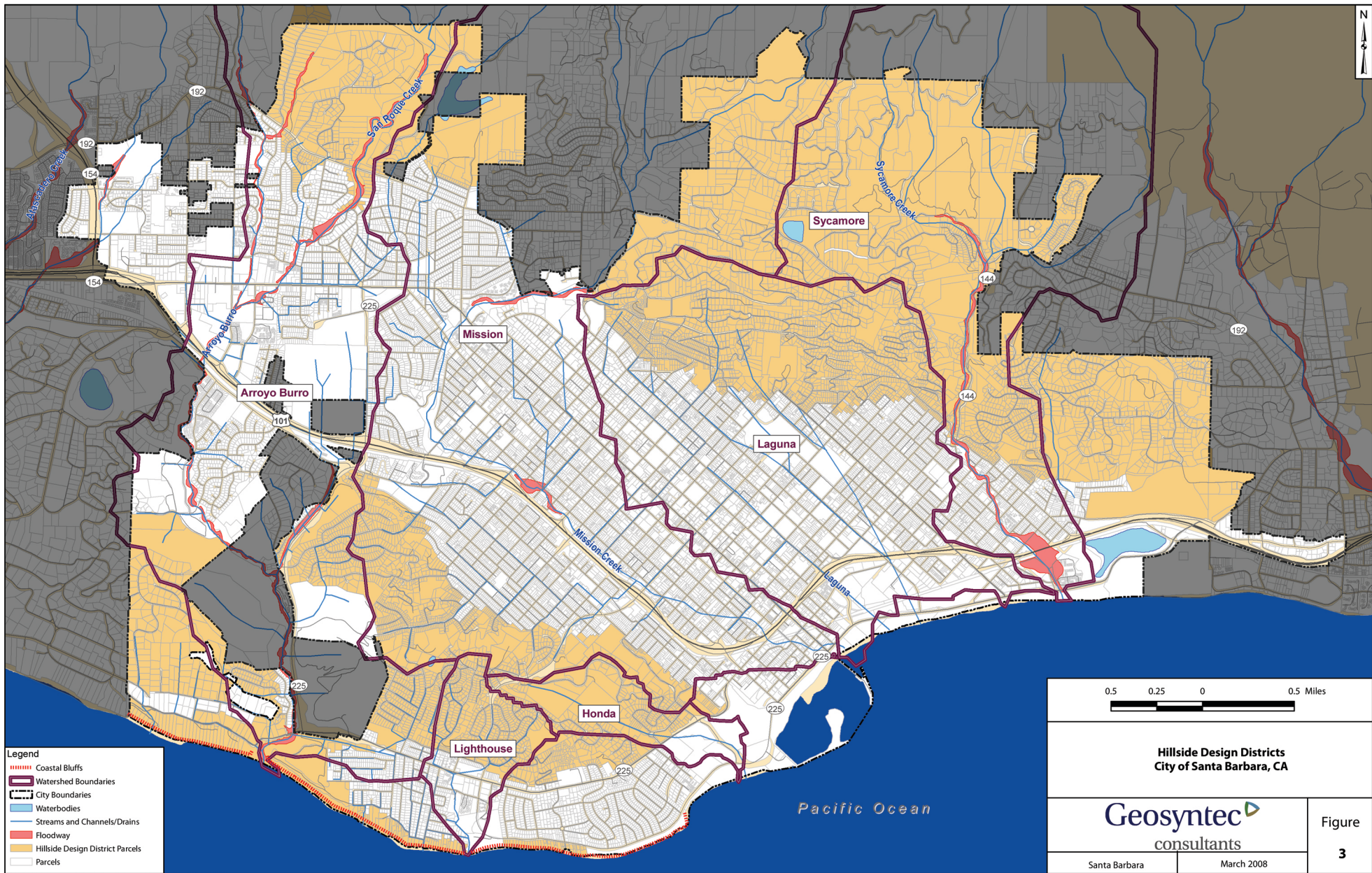
BMPs shall be selected based on the following items to the maximum extent practicable:

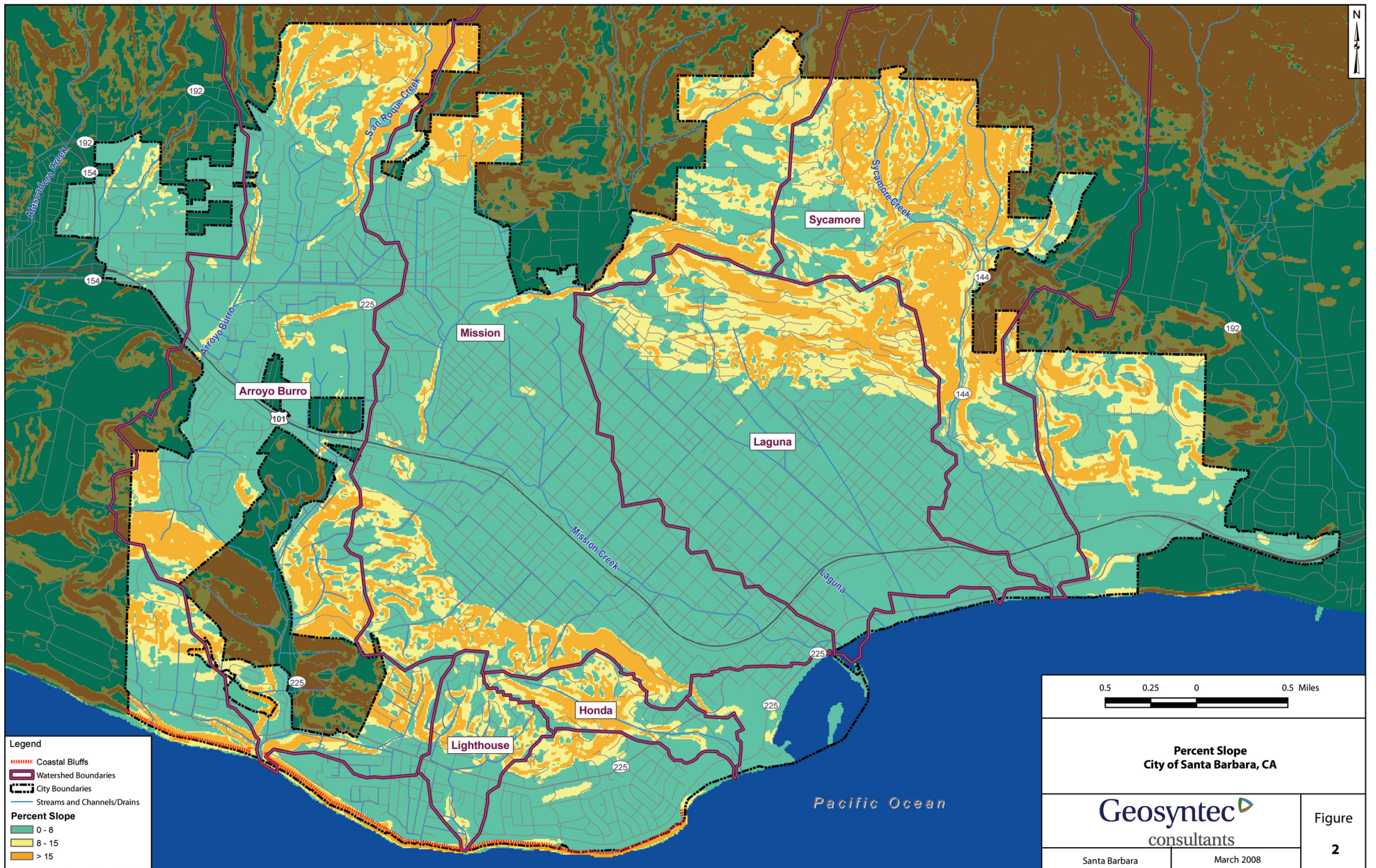
1. site specific constraints;

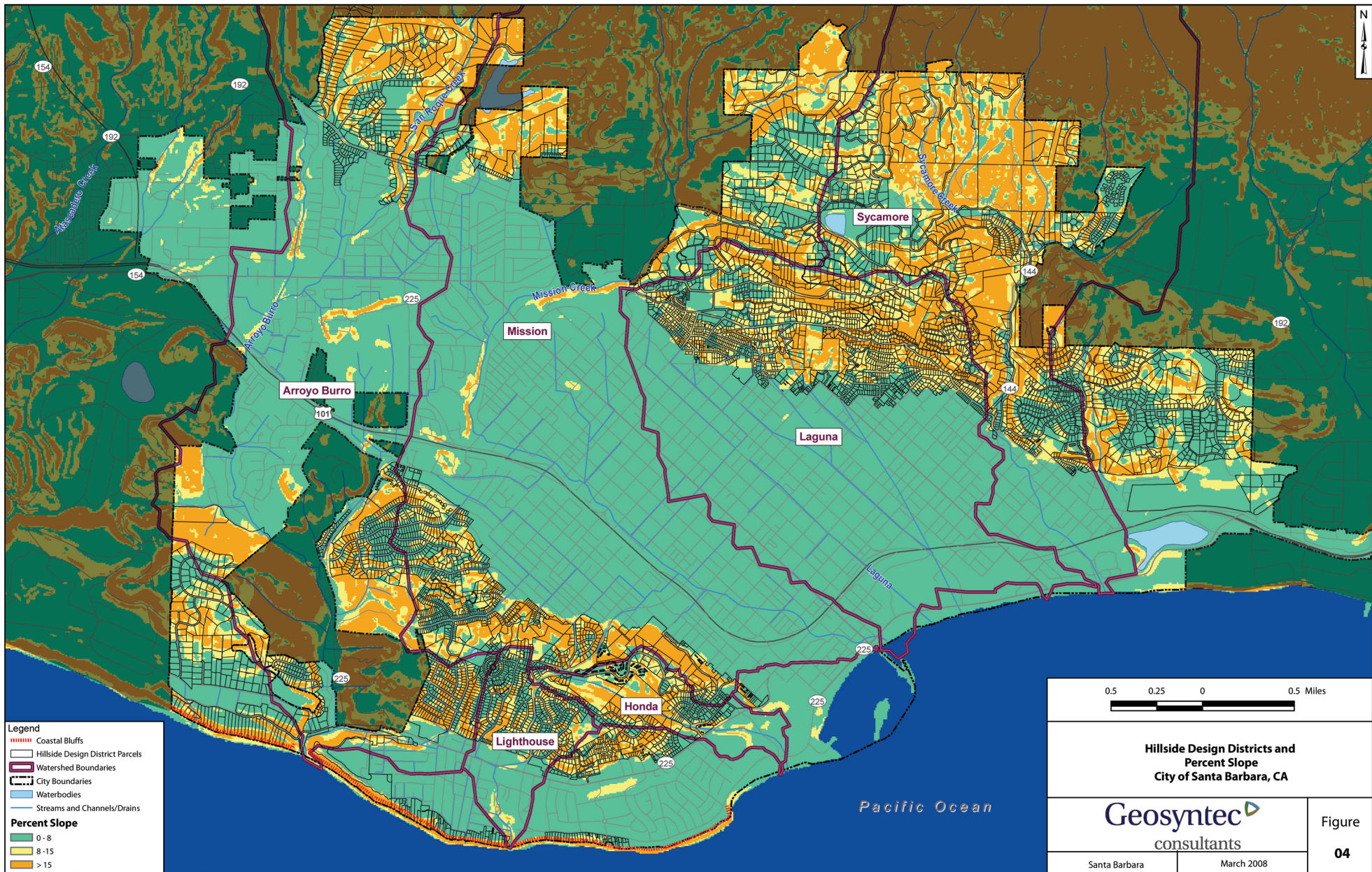
2. pollutants of concern based on proposed land use type and receiving water conditions;
3. low impact development principles and practices (see Section 1.2.1);
4. meeting the post-construction storm water requirements based on project tier (see Section 1.3);
5. cost considerations; and
6. long-term maintenance considerations.

Targeting specific pollutants of concern based on proposed land use and known site contaminants is required. Site and soil assessment information (Chapters 2 and 3) shall be used in combination with the BMP matrix tables: Table 5-1, Table 6-1, Table 6-2 (Chapters 5 and 6, respectively), to determine appropriate BMPs for a given site.
















































































**Table 6-1: BMP Selection Matrix - Pollutants of Concern**

*Important Note to Users:* Treatment effectiveness for pollutants of concern can vary widely for individual BMPs. This table should be used to provide general BMP comparisons only and should not replace the evaluation performed by a water quality professional. For greater accuracy, only compare treatment effectiveness within each of the Stormwater Runoff BMP Categories.

Manual Section	Stormwater Runoff BMP Category	Stormwater Runoff BMP	Volume Mitigation (% of inflow)	Treatment Effectiveness for Pollutants of Concern <sup>1</sup>					
				Trash	Nutrients	Bacteria	Metals (particulate and dissolved fractions)	Sediment	Organics (hydrocarbons, oil, and grease)
6.6	Biofiltration and Filtration BMPs	Bioretention							
		Vegetated Swale Filter							
		Vegetated Filter Strip							
		Sand Filter							
6.7	Infiltration BMPs	Includes infiltration trenches, infiltration basins, and dry wells							
6.8	Permeable Pavement BMPs	Includes pervious concrete, porous asphalt, permeable pavers, grass-pave, and gravel-pave							
6.9	Building BMPs	Cistern/Rain Barrel		Building BMPs are generally intended for achieving volume reduction of roof drainage. Treatment effectiveness of building BMPs are not comparable to other BMPs in this table that treat runoff from a wide range of impervious surfaces that generally have higher pollutant concentrations.					
		Planter Box							
		Green Roof							
6.10	Retention and Detention BMPs	Constructed Treatment Wetland							
		Wet Retention Basin							
		Dry Extended Detention Basin							
6.11	Proprietary Devices	Includes hydrodynamic devices, catch basins, media filters, and biotreatment devices	The treatment effectiveness of specific proprietary devices must be provided by the manufacturer and should be verified by independent third-party sources and data or assessed by a professional consultant.						

Very High	High	Moderate	Low	Very Low
				

<sup>1</sup> Effectiveness may change based on design variations; standard BMP designs have been assumed.

**Table 6-2: BMP Selection Matrix - Site Suitability**

*Important Note to Users:* Site suitability can vary widely for individual BMPs. This table should be used to provide general BMP comparisons only and should not replace the evaluation performed by a water quality professional. For greater accuracy, only compare site suitability considerations within each of the Stormwater Runoff BMP Categories. BMPs shall be selected that have high or very high treatment effectiveness for the primary pollutants of concern as defined in Section 6.3.

Manual Section	Stormwater Runoff BMP Category	Stormwater Runoff BMP	Site Suitability Considerations					Applicability for Special Design Districts	
			Tributary Area (Acres) <sup>1</sup>	Site Slope (%)	Depth to Seasonally High Groundwater (ft)	Hydrologic Soil Group (HSG) <sup>6</sup>	Horizontal Setback from Drinking Water Wells (ft)	Coastal Bluff Areas	Hillside Design District
6.6	Biofiltration and Filtration BMPs	Bioretention	< 5	< 15; planter boxes are generally more suitable for steep slopes <sup>2,3</sup>	> 2 with underdrains; > 10 without underdrains	Underdrains should be provided for "C" and "D" soils	100 <sup>7</sup>	Acceptable if: (1) they are not designed to promote infiltration (i.e., swales do not have a gravel drainage layer), (2) underdrains and an impermeable liner are provided regardless of HSG soil type, and (3) site slope meets the criteria in the matrix table.	Acceptable if: (1) a geotechnical investigation proves that the facility does not compromise the stability of the site slope or surrounding slopes, or (2) the facility includes an impermeable liner, underdrain system, and an overflow to a stormwater conveyance system, if the facility is on-line.
		Vegetated Swale Filter	< 5	< 10 site slope; 0.5 to 6 longitudinal slope of swale <sup>2,3</sup>	> 2 with underdrains; > 10 without underdrains	Any <sup>3</sup>	100 <sup>7</sup>		
		Vegetated Filter Strip	< 2	< 5 site slope; 2 to 6 longitudinal slope of strip <sup>2</sup>	> 2	Any	N/A		
		Sand Filter	< 10	< 15 <sup>4</sup>	> 2 with underdrains; > 10 without underdrains	Any	N/A		
6.7	Infiltration BMPs	Includes infiltration trenches, infiltration basins, and dry wells	< 5	< 7 <sup>2</sup>	> 10	May not be feasible in "C" soils. Not suitable in "D" soils.	100	Infiltration BMPs are <u>not</u> permissible in Coastal Bluff Areas.	Acceptable if a geotechnical investigation proves that the facility does not compromise the stability of the site slope or surrounding slopes.
6.8	Permeable Pavement BMPs	Includes pervious concrete, porous asphalt, permeable pavers, grass-pave, and gravel-pave	< 5	< 5 <sup>2,5</sup>	> 2 with underdrains; > 10 without underdrains	Underdrains should be provided for "C" and "D" soils	100 <sup>7</sup>	Acceptable if: (1) the facility is fully contained with an impermeable liner, underdrain system, and overflow to a stormwater conveyance system, and (2) the site slope meets the criteria provided in this matrix table.	Acceptable if: (1) a geotechnical investigation proves that the facility does not compromise the stability of the site slope or surrounding slopes, or (2) the facility is fully contained with an impermeable liner, underdrain system, and overflow to a stormwater conveyance system.

<sup>1</sup> Tributary area is the area of the site draining to the BMP. Tributary areas provided here should be used as a general guideline only. Tributary areas can be larger or smaller in some instances.

<sup>2</sup> If site slope exceeds that specified or if the system is within 200 ft from the top of a hazardous slope or landslide area (on the uphill side), a geotechnical investigation analysis and report addressing slope stability shall be prepared by a licensed civil engineer. In addition, for swales, if the longitudinal slope exceeds 6%, check dams should be provided.

<sup>3</sup> If system is located within 50 feet of a sensitive steep slope (on the uphill side) or 10 feet from a structure, has a longitudinal slope less than 1.5% (swales), or has poorly drained soils (e.g. silts and clays), underdrains should be incorporated.

<sup>4</sup> If system is fully contained and includes a liner, underdrain system, and overflow to a stormwater conveyance system, then slopes can exceed 15%.

<sup>5</sup> If a gravel base is used for storage of runoff: (1) slopes should be restricted to 0.5% (steeper grades reduce storage capacity) and (2) underdrains should be used if within 50 feet of a sensitive steep slope.

<sup>6</sup> Hydrologic soil groups "A" and "B" are well-drained soils with infiltration rates greater than 0.5 in/hr. Hydrologic soil groups "C" and "D" are generally poorly-drained soils with infiltration rates less than 0.5 in/hr. See Chapter 3 for more information.

<sup>7</sup> Setbacks apply to systems without underdrains or systems underlain by "A" or "B" hydrologic soil groups.

<sup>8</sup> If dry extended detention basins will be designed to encourage significant infiltration (i.e., sand filter extended detention basins), the basins should be separated from drinking water wells by at least 100 feet.

**Table 6-2: BMP Selection Matrix - Site Suitability (continued)**

*Important Note to Users:* Site suitability can vary widely for individual BMPs. This table should be used to provide general BMP comparisons only and should not replace the evaluation performed by a water quality professional. For greater accuracy, only compare site suitability considerations within each of the Stormwater Runoff BMP Categories. BMPs shall be selected that have high or very high treatment effectiveness for the primary pollutants of concern as defined in Section 6.3.

6.9	Building BMPs	Cistern/Rain Barrel	Depends on system size	Any	> 2 if tank is underground	Any	N/A	Acceptable if a geotechnical investigation is provided to ensure that the facility does not compromise the stability of the site slope or surrounding slopes. If the stored rain water is to be used for irrigation, City staff will determine how much (if any) water application to the bluff is appropriate.	Acceptable if a geotechnical investigation is provided to ensure that the facility does not compromise the stability of the site slope or surrounding slopes. If the stored rain water is to be used for irrigation, City staff will determine how much (if any) water application to the sloped property is appropriate.
		Planter Box	Equal to roof tributary area	< 15 <sup>4</sup>	> 2	Any	N/A	Acceptable if: (1) the facility is fully contained with an impermeable liner, underdrain system, and overflow to a stormwater conveyance system, and (2) the site slope meets the criteria provided in this matrix table.	
		Green Roof	Equal to roof tributary area	N/A	N/A	N/A	N/A	Acceptable if overflow is captured in another acceptable BMP or if it is conveyed safely to a stormwater conveyance system.	
6.10	Retention and Detention BMPs	Constructed Treatment Wetland	> 5	< 8 <sup>2</sup>	N/A	"A" soils may require pond liner; "B" soils may require infiltration testing	N/A	Retention and Detention BMPs are generally not acceptable in Coastal Bluff Areas.	Acceptable if: (1) a geotechnical investigation proves that the facility does not compromise the stability of the site slope or surrounding slopes, or (2) the facility meets the site slope criteria in this matrix table and the facility is fully contained with an impermeable liner and overflow to a stormwater conveyance system.
		Wet Retention Basin	> 10	< 15 <sup>2</sup>	N/A	"A" soils may require pond liner; "B" soils may require infiltration testing	N/A		
		Dry Extended Detention Basin	> 5	< 15 <sup>2</sup>	> 2 if infiltration is not significant; >10 when basin is designed to achieve volume reduction requirements	Any	100 <sup>8</sup>		
6.11	Proprietary Devices	Includes hydrodynamic devices, catch basins, media filters, and biotreatment devices	The site suitability requirements for specific proprietary devices must be provided by the manufacturer and should be verified by independent third-party sources and data or assessed by a professional consultant.						

<sup>1</sup> Tributary area is the area of the site draining to the BMP. Tributary areas provided here should be used as a general guideline only. Tributary areas can be larger or smaller in some instances.

<sup>2</sup> If site slope exceeds that specified or if the system is within 200 ft from the top of a hazardous slope or landslide area (on the uphill side), a geotechnical investigation analysis and report addressing slope stability shall be prepared by a licensed civil engineer. In addition, for swales, if the longitudinal slope exceeds 6%, check dams should be provided.

<sup>3</sup> If system is located within 50 feet of a sensitive steep slope (on the uphill side) or 10 feet from a structure, has a longitudinal slope less than 1.5% (swales), or has poorly drained soils (e.g. silts and clays), underdrains should be incorporated.

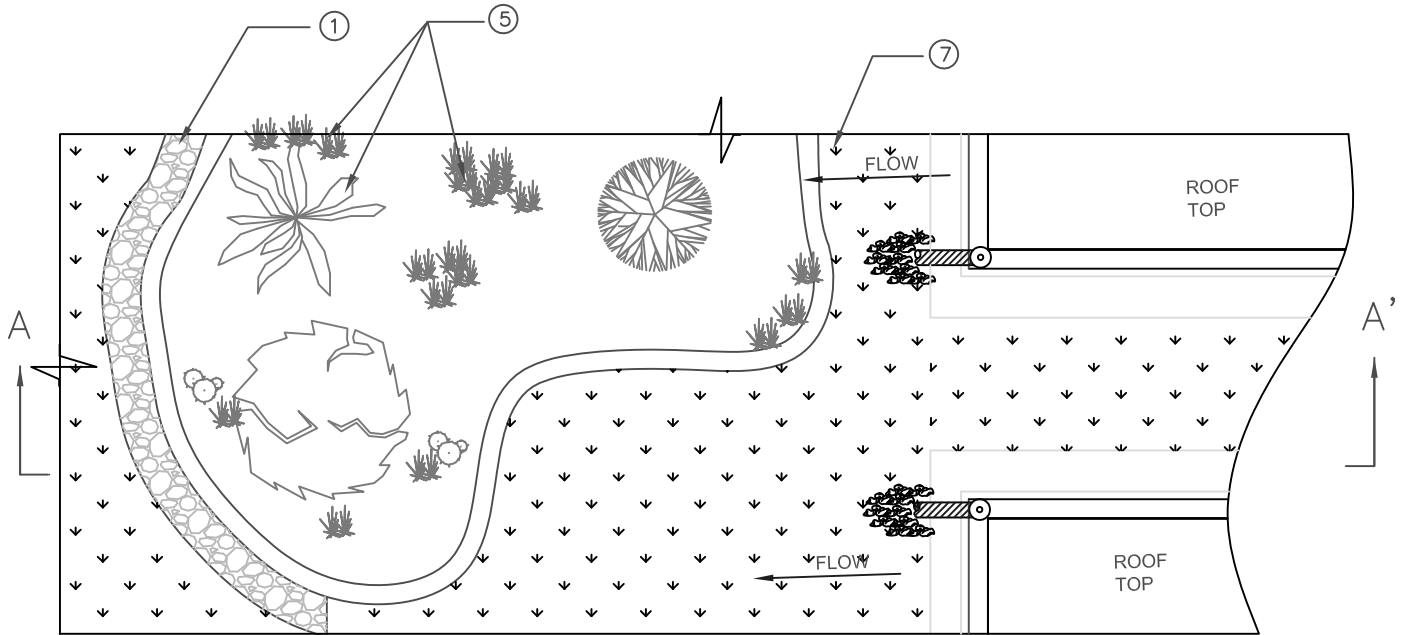
<sup>4</sup> If system is fully contained and includes a liner, underdrain system, and overflow to a stormwater conveyance system, then slopes can exceed 15%.

<sup>5</sup> If a gravel base is used for storage of runoff: (1) slopes should be restricted to 0.5% (steeper grades reduce storage capacity) and (2) underdrains should be used if within 50 feet of a sensitive steep slope.

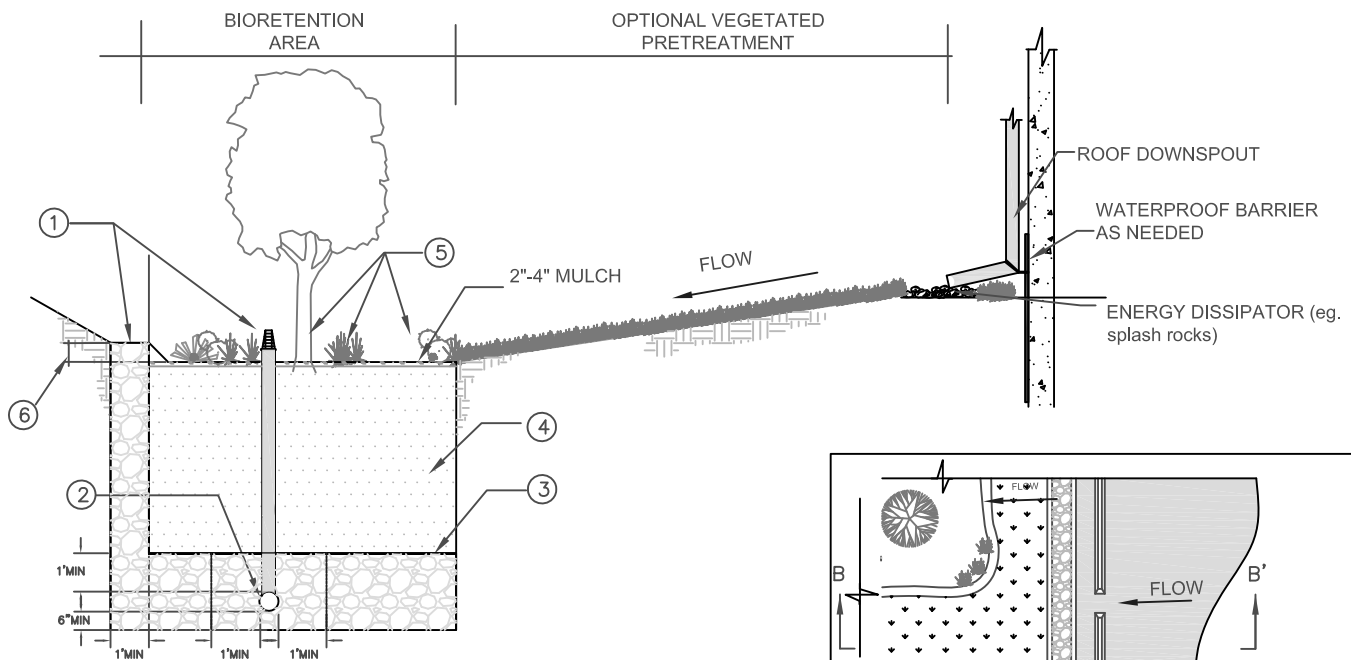
<sup>6</sup> Hydrologic soil groups "A" and "B" are well-drained soils with infiltration rates greater than 0.5 in/hr. Hydrologic soil groups "C" and "D" are generally poorly-drained soils with infiltration rates less than 0.5 in/hr. See Chapter 3 for more information.

<sup>7</sup> Setbacks apply to systems without underdrains or systems underlain by "A" or "B" hydrologic soil groups.

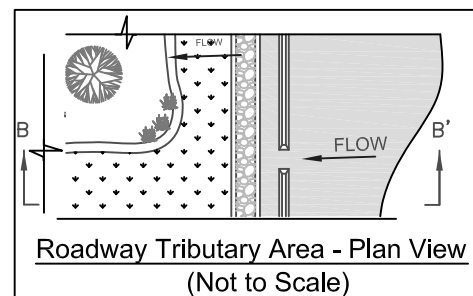
<sup>8</sup> If dry extended detention basins will be designed to encourage significant infiltration (i.e., sand filter extended detention basins), the basins should be separated from drinking water wells by at least 100 feet.



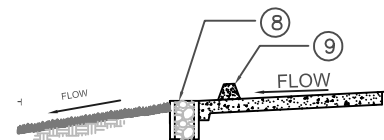
**Plan View**  
(Not to Scale)



**Section A-A'**  
(Not to Scale)



**Roadway Tributary Area - Plan View**  
(Not to Scale)



**Section B-B'**  
(Not to Scale)

#### NOTES

- ① OVERFLOW DEVICE: OPTION 1 - VERTICAL RISER, OPTION 2 - PEA GRAVEL CURTAIN DRAIN, OPTION 3 - FLOW SPREADER.
- ② PERFORATED PIPE UNDERDRAIN SYSTEM (AS NEEDED). WHERE SOIL CONDITIONS ALLOW, OMIT THE UNDERDRAIN AND INSTALL AN APPROPRIATELY SIZED GRAVEL DRAINAGE LAYER (TYPICALLY A WASHED 57 STONE) BENEATH THE PLANTING MEDIA FOR ENHANCED INFILTRATION.
- ③ OPTIONAL GEOTEXTILE FABRIC OR CHOKING STONE LAYER.
- ④ 2' MIN PLANTING MIX; 3' PREFERRED.
- ⑤ VEGETATION; SEE APPENDIX G.
- ⑥ 18" MAX PONDING DEPTH.
- ⑦ OPTIONAL VEGETATION BUFFER / PRETREATMENT (E.G. FILTER STRIP OR SWALE).
- ⑧ PEA GRAVEL DIAPHRAGM MAY BE USED IN LIEU OF SLOTTED WHEEL STOPS.
- ⑨ SLOTTED WHEEL STOPS / CURB CUTS MAY BE USED IN LIEU OF GRAVEL DIAPHRAGM, BUT ENERGY DISSIPATION MUST BE CONSIDERED.

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Figure 6 - 2  
BIORETENTION